Active learning

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Active learning is a teaching method that strives to more directly involve students in the learning process.

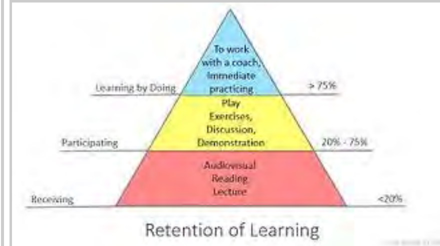
The term *active learning* "was introduced by the English scholar R W Revans (1907–2003)."[1] Bonwell (1991) "states that in active learning, students participate in the process and students participate when they are doing something besides passively listening." (Weltman, p. 7) Active learning is "a method of learning in which students are actively or experientially involved in the learning process and where there are different levels of active learning, depending on student involvement." (Weltman, p. 8) It is a model of instruction that focuses the responsibility of learning on learners. It was popularized in the 1990s by its appearance on the Association for the Study of Higher Education (ASHE) report (Bonwell & Eison 1991). In this report they discuss a variety of methodologies for promoting "active learning". They cite literature that indicates that to learn, students must do more than just listen: They must read, write, discuss, or be engaged in solving problems. It relates to the three learning domains referred to as knowledge, skills and attitudes (KSA), and that this taxonomy of learning behaviours can be thought of as "the goals of the learning process" (Bloom, 1956). In particular, students must engage in such higher-order thinking tasks as analysis, synthesis, and evaluation.[2] Active learning engages students in two aspects – doing things and thinking about the things they are doing (Bonwell and Eison, 1991).

Contents

Nature of active learning

There are diverse range of alternatives for the term "active learning" like learning through play, technology based learning, activity based learning, group work, project method, etc. the underlying factor behind these are some significant qualities and characteristics of active learning. Active learning is the opposite of passive learning; it is learner-centered, not teacher-centered, and requires more than just listening; active participation of each and every student is a necessary aspect in active learning. Students must be doing things and simultaneously think about the work done and the purpose behind it so that they can enhance their higher order thinking capabilities. Many research studies have proven that active learning as a strategy has promoted

achievement levels and some others say that content mastery is possible through active learning strategies. However, some students as well as teachers find it difficult to adapt to the new learning technique.[3] Active learning should transform students from passive listeners to active participants, helps the student understand the subject through inquiry, gathering and analyzing data to solving higher order cognitive problems. There is intensive use of scientific and quantitative literacy across the curriculum and technology based learning is also in high demand in concern with active learning.[4] Barnes (1989) [5][6] suggested principles of active learning:



Learning Retention Pyramid, based on Bloom's taxonomy. Active learning is above, passive learning below

1. **Purposive:** the relevance of the task with the students' concerns.
2. **Reflective:** students' reflection on the meaning of what is learnt.
3. **Negotiated:** negotiation of goals and methods of learning between students and teachers.
4. **Critical:** students appreciate different ways and means of learning the content.
5. **Complex:** students compare learning tasks with complexities existing in real life and making reflective analysis.
6. **Situation-driven:** the need of the situation is considered in order to establish learning tasks.
7. **Engaged:** real life tasks are reflected in the activities conducted for learning.

Active learning requires appropriate learning environments through the implementation of correct strategy. Characteristics of learning environment are:[7][8]

1. Aligned with constructivist strategies and evolved from traditional philosophies.
2. Promoting research based learning through investigation and contains authentic scholarly content.
3. Encouraging leadership skills of the students through self-development activities.
4. Creating atmosphere suitable for collaborative learning for building knowledgeable learning communities.
5. Cultivating a dynamic environment through interdisciplinary learning and generating high-profile activities for better learning experience.
6. Integration of prior knowledge with new ones to incur rich structure of knowledge among the students.
7. Task based performance enhancement by giving the student's a realistic practical sense of the subject matter learnt in the classroom.

Constructivist framework

Active learning coordinates with the principles of constructivism which are, cognitive, meta-cognitive, evolving and affective in nature. Studies have shown that immediate results in construction of knowledge is not possible through active learning, the child goes through process of knowledge construction, knowledge recording and knowledge absorption. This process of knowledge construction is dependent on previous knowledge of the learner where the learner is self-aware of the process of cognition and can control and regulate it by themselves.[9] There are several aspects of learning and some of them are:

1. Learning through meaningful reception by David Ausubel, he emphasizes on the previous knowledge the learner possesses and considers it as key factor to learning
2. Learning through discovery by Jerome Bruner, where students learn through discovery of ideas with the help of situations provided by the teacher.
3. Conceptual change, misconceptions takes place as the student's discover knowledge without any

guidance, teacher's provide knowledge keeping in mind the common misconceptions about the content and keep an evaluatory check on the knowledge constructed by the students.

4. Social Constructivism by Bandura and Vygotsky, collaborative group work within the framework of cognitive strategies like questioning, clarifying, predicting and summarizing.[10]

Active learning exercises

Bonwell and Eison (1991) suggested learners work collaboratively, discuss materials while role-playing, debate, engage in case study, take part in cooperative learning, or produce short written exercises, etc. The argument is "when should active learning exercises be used during instruction?". Numerous studies have shown that introducing active learning activities (such as simulations, games, contrasting cases, labs,..) before, rather than after lectures or readings, results in deeper learning, understanding, and transfer.[11][12][13][14][15][16][17][18] The degree of instructor guidance students need while being "active" may vary according to the task and its place in a teaching unit. In an active learning environment learners are immersed in experiences within which they engage in meaning-making inquiry, action, imagination, invention, interaction, hypothesizing and personal reflection (Cranton 2012).

Examples of "active learning" activities include

- A **class discussion** may be held in person or in an online environment. Discussions can be conducted with any class size, although it is typically more effective in smaller group settings. This environment allows for instructor guidance of the learning experience. Discussion requires the learners to think critically on the subject matter and use logic to evaluate their and others' positions. As learners are expected to discuss material constructively and intelligently, a discussion is a good follow-up activity given the unit has been sufficiently covered already.[19] Some of the benefits of using discussion as a method of learning are that it helps students explore a diversity of perspectives, it increases intellectual agility, it shows respect for students’ voices and experiences, it develops habits of collaborative learning, it helps students develop skills of synthesis and integration (Brookfield 2005). In addition, by having the teacher actively engage with the students, it allows for them to come to class better prepared and aware of what is taking place in the classroom.[20]
- A **think-pair-share** activity is when learners take a minute to ponder the previous lesson, later to discuss it with one or more of their peers, finally to share it with the class as part of a formal discussion. It is during this formal discussion that the instructor should clarify misconceptions. However students need a background in the subject matter to converse in a meaningful way. Therefore, a "think-pair-share" exercise is useful in situations where learners can identify and relate what they already know to others. So preparation is key. Prepare learners with sound instruction before expecting them to discuss it on their own. If properly implemented, it saves instructor time, keeps students prepared, helps students to get more involved in class discussion and participation and provide cumulative assessment of student progress. The "think-pair-share" method is useful for teachers to hear from all students even those who are quiet in class. This teaching method functions as a great way for all the students in the class to get involved and learn to work together and feel comfortable sharing ideas. It can also help teachers or instructors to observe students and see if they understand the material being discussed.[21] This is not a good strategy to use in large classes because of time and logistical constraints (Bonwell and Eison, 1991). Think-pair-share is helpful for the instructor as it enables organizing content and tracking students on where they are relative to the topic being discussed in class, saves time so that he/she can move to other topics, helps to make the class more interactive, provides opportunities for students to interact with each other (Radhakrishna, Ewing, and Chikthimmah, 2012).

- A **learning cell** is an effective way for a pair of students to study and learn together. The learning cell was developed by Marcel Goldschmid of the Swiss Federal Institute of Technology in Lausanne (Goldschmid, 1971). A learning cell is a process of learning where two students alternate asking and answering questions on commonly read materials. To prepare for the assignment, the students read the assignment and write down questions that they have about the reading. At the next class meeting, the teacher randomly puts students in pairs. The process begins by designating one student from each group to begin by asking one of their questions to the other. Once the two students discuss the question, the other student ask a question and they alternate accordingly. During this time, the teacher goes from group to group giving feedback and answering questions. This system is also called a *student dyad*.
- A **short written exercise** that is often used is the "one-minute paper." This is a good way to review materials and provide feedback. However a "one-minute paper" does not take one minute and for students to concisely summarize it is suggested that they have at least 10 minutes to work on this exercise. (See also: Quiz#In education.)
- A **collaborative learning group** is a successful way to learn different material for different classes. It is where you assign students in groups of 3-6 people and they are given an assignment or task to work on together. This assignment could be either to answer a question to present to the entire class or a project. Make sure that the students in the group choose a leader and a note-taker to keep them on track with the process. This is a good example of active learning because it causes the students to review the work that is being required at an earlier time to participate. (McKinney, Kathleen. (2010). Active Learning. Normal, IL. Center for Teaching, Learning & Technology.) To create participation and draw on the wisdom of all the learners the classroom arrangement needs to be flexible seating to allow for the creation of small groups. (Bens, 2005)
- A **student debate** is an active way for students to learn because they allow students the chance to take a position and gather information to support their view and explain it to others. These debates not only give the student a chance to participate in a fun activity but it also lets them gain some experience with giving a verbal presentation. (McKinney, Kathleen. (2010). Active Learning. Normal, IL. Center for Teaching, Learning & Technology.)
- A **reaction to a video** is also an example of active learning because most students love to watch movies. The video helps the student to understand what they are learning at the time in an alternative presentation mode. Make sure that the video relates to the topic that they are studying at the moment. Try to include a few questions before you start the video so they pay more attention and notice where to focus at during the video. After the video is complete divide the students either into groups or pairs so that they may discuss what they learned and write a review or reaction to the movie. (McKinney, Kathleen. (2010). Active Learning. Normal, IL. Center for Teaching, Learning & Technology.)
- A **small group discussion** is also an example of active learning because it allows students to express themselves in the classroom. It is more likely for students to participate in small group discussions than in a normal classroom lecture because they are in a more comfortable setting amongst their peers, and from a sheer numbers perspective, by dividing the students up more students get opportunities to speak out. There are so many different ways a teacher can implement small group discussion in to the class, such as making a game out of it, a competition, or an assignment. Statistics show that small group discussions is more beneficial to students than large group discussions when it comes to participation, expressing thoughts, understanding issues, applying issues, and overall status of knowledge.[22]
- A **class game** is also considered an energetic way to learn because it not only helps the students to review the course material before a big exam but it helps them to enjoy learning about a topic. Different games such as *Jeopardy!* and crossword puzzles always seem to get the students' minds going. (McKinney, Kathleen. (2010). Active Learning. Normal, IL. Center for Teaching, Learning & Technology.)

- **Learning By Teaching** is also an example of active learning because students actively research a topic and prepare the information so that they can teach it to the class. This helps students learn their own topic even better and sometimes students learn and communicate better with their peers than their teachers.
- Gallery Walk is also an example of active learning where students in groups move around the classroom or workshop actively engaging in discussions and contributing to other groups and finally constructing knowledge on a topic and sharing it.

Use of technology

To have active learning experience, use of technology tools and multimedia helps enhance the atmosphere of the classroom. Each student actively engages in the learning process. Using movies and games the teacher can make the experience more effective. The theoretical foundation of this learning process are :

1. **Flow:** Flow is a concept to enhance the focus level of the student as each and every individual becomes aware and completely involved in the learning atmosphere. In accordance with one's own capability and potential, through self-awareness, students perform the task at hand. The first methodology to measure flow was Csikszentmihalyi's Experience Sampling (ESM).
2. **Learning Styles:** Acquiring knowledge through one's own technique is called learning style. Learning occurs in accordance with one's own potential as every child is different and has potential in different areas. It caters to all kinds of learners: visual, kinaesthetic, cognitive and affective.
3. **Locus of Control:** Ones with high internal locus of control believe that every situation or event is attributable to their resources and behavior. Ones with high external locus of control believe that nothing is under their control.
4. **Intrinsic Motivation:** Intrinsic motivation is a factor that deals with self-perception about the task at hand. Interest, attitude, and results depend on the self-perception of the given activity.[23]

Research evidence

Numerous studies have shown evidence to support active learning, given adequate prior instruction.

Richard Hake (1998) reviewed data from over 6000 physics students in 62 introductory physics courses and found that students in classes that utilized active learning and interactive engagement techniques improved 25 percent points, achieving an average gain of 48% on a standard test of physics conceptual knowledge, the Force Concept Inventory, compared to a gain of 23% for students in traditional, lecture-based courses.[24]

Similarly, Hoellwarth & Moelter (2011)[25] showed that when instructors switched their physics classes from traditional instruction to active learning, student learning improved 38 percent points, from around 12% to over 50%, as measured by the Force Concept Inventory, which has become the standard measure of student learning in physics courses.

In "Does Active Learning Work? A Review of the Research", Prince (2004) found that "there is broad but uneven support for the core elements of active, collaborative, cooperative and problem-based learning" in engineering education.[26]

Michael (2006),[27] in reviewing the applicability of active learning to physiology education, found a "growing body of research within specific scientific teaching communities that supports and validates the new approaches to teaching that have been adopted."

In a 2012 report titled "Engage to Excel",[28] the United States President's Council of Advisors on Science and Technology (PCAST) described how improved teaching methods, including engaging students in active learning, will increase student retention and improve performance in STEM courses. One study described in the report found that students in traditional lecture courses were twice as likely to leave engineering and three times as likely to drop out of college entirely compared with students taught using active learning techniques. In another cited study, students in a physics class that used active learning methods learned twice as much as those taught in a traditional class, as measured by test results.

See also

- Oswego Movement
- Design-based learning
- Experiential learning
- Learning environment
- Learning space
- School organizational models
- Sloyd

Meetings

- 2016 "Workshop Active Learning: Applications, Foundations and Emerging Trends"[29]

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External links

- Educational psychology in classroom settings. A developing open-source **Wikibook** related to learning as discussed in this article.
- Making Active Learning Work (http://www1.umn.edu/ohr/teachlearn/tutorials/active/index.html)
- New Directions for Cooperative Education. ERIC Digest. (http://www.ericdigests.org/2000-2/new.htm)
- The Essential Elements of Cooperative Learning in the Classroom. ERIC Digest. (http://www.ericdigests.org/1995-1/elements.htm)
- Active learning section of Geoff Petty's practical guide on improving teaching and learning. (http://www.geoffpetty.com/activelearning.html)
- Platform for Active Learning (University of Hull) (http://www.hull.ac.uk/pal/). Includes bank of examples.
- Learning by teaching - by Jody Skinner (http://www.developingteachers.com/articles_tchtraining/koblenz1_jody.htm)
- Action-oriented learning area teaching at vocational schools - Rainer Gerke, Ph.D. (Weimar University) (http://en.rainergerke.net)
- Learning English by Active Learning with AMA (http://www.ama.edu.vn)

Categories: Applied learning | Educational practices | Curricula | Philosophy of education | Educational psychology